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**INTELLIGENCE MEMORANDUM**

**POPULATION FERTILITY IN THE USSR AND THE US  
1940-55**

**CIA/RR IM-445**

**21 January 1957**

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POPULATION FERTILITY IN THE USSR AND THE US\*  
1940-55

Summary and Conclusions

The trends of population fertility in the USSR and the US moved in opposite directions from 1940 to 1955. By any of the measures used in this memorandum, Soviet fertility dropped 18 to 20 percent, and US fertility increased 37 to 55 percent. The Soviet rate dropped from 1940 to 1950 and then stabilized. The major portion of the US increase was also from 1940 to 1950, but the upward trend has continued.

This dramatic divergence in trends has reversed the position of the two countries as to level of fertility. In 1940, US fertility was only about 60 percent of that in the USSR, but in 1955 it was 120 percent as measured by the gross reproduction rate.

Rising fertility in the US and declining fertility in the USSR have important implications for changes in the labor supply of the two countries. When the large number of war babies in the US and the abnormally small number of war babies in the USSR begin to enter the labor force during the next 5 years, the rate of increase in the labor supply of the US will rise while the rate of increase in the labor supply of the USSR will decline. This condition will continue almost to 1970. The increase in the Soviet population between the ages of 15 and 59 is estimated to have been over 13 million during the Fifth Five Year Plan (1951-55) but will probably be only about 5.4 million during the Sixth Five Year Plan (1956-60). This increasing tightness in the labor supply of the USSR is exerting a major impact on the prospects for the fulfillment of the ambitious plans for continued economic expansion. Increasing urgency is attached to the solution of the manpower problem, and mounting attention to measures aimed at compensating for the reduced expansion in the labor supply is expected. Among the expected measures are the following: further transfers of labor from agriculture, strenuous efforts to increase productivity, fullest utilization of the large numbers being graduated from school, and continuance of a high rate of employment of males over 60 years of age. The sluggish expansion of the labor supply is one of the probable reasons for the announced reduction in the armed forces.

\* The estimates and conclusions contained in this memorandum represent the best judgment of ORR as of 1 January 1957.

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The results of wartime infant mortality in the USSR coupled with the decline in fertility will be especially evident in the coming 20 years in the slower rate of increase in the number of males 20 to 30 years of age. The number in this group of prime military manpower in the USSR exceeded the number in the US by over 7 million in 1956 but will probably be only about 3 million greater than in the US by 1975.

The basic causes of the decline in Soviet fertility are the male war losses, the depressed postwar living conditions, and the higher proportions of young women continuing their schooling. A principal aspect of the second of the above factors, crowded housing, was probably intensified by the continued industrialization and urbanization of the population.

The increase in the US cannot be attributed to a more favorable population structure. It is rather attributable to the differences in the childbearing behavior of women 15 to  $\frac{4}{5}$  years of age, which include earlier marriage, earlier birth of first children, and a change in the attitude as to optimum family size.

The probability is small that the balance of these factors affecting the levels of fertility will change sufficiently to narrow the gap in fertility between the countries appreciably before 1965 unless dramatic changes occur in levels of living.

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1. Introduction.

This memorandum compares the USSR with the US in terms of population fertility on the basis of admittedly scanty evidence as to the characteristics of the childbearing group in the USSR.\*

2. Trends, 1940-55.

The trend in fertility in the USSR and the US since 1940 is demonstrated in Table 1\*\* by three measures which are used by population analysts in comparing levels of human fertility.

The crude birth rates shown in the first two columns of Table 1 relate the total number of births during a year to the total population -- that is, the number of births divided by the number of thousands in the total population. These figures are published for both the US and the USSR and are considered to be fairly firm figures subject only

\* The sources and methodology used in this report are discussed in the Appendix.

\*\* Table 1 follows on p. 3.

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Table 1

Comparison of Population Fertility in the USSR and the US  
1940 and 1950-55

Year	Crude Birth Rate <u>Per 1,000 Population</u>		Female Births Per 1,000 Women Age 15 to 44		Gross Reproduction Rate <u>Per 1,000 Women</u>	
	US	USSR*	US	USSR†	US	USSR*
1940	17.9	31.7	39.0	62.2	1,121	1,800
1950	23.5	26.5	51.8	49.1	1,505	1,408
1951	24.5	26.8			1,591	1,432
1952	24.7	26.4			1,635	1,422
1953	24.6	24.9			1,665	1,350
1954	24.9	26.5			1,723	1,448
1955	24.6	25.6	56.7	48.4	1,734	1,410
Ratio of 1955 to 1940	1.37		0.80	1.45	1.55	0.78
Ratio of US to USSR, 1955		0.96		1.17		1.23
Ratio of US to USSR, 1940		0.56		0.63		0.62

to errors arising from imperfections in the registration systems.\* The comparison indicates that the crude birth rate of the USSR dropped from 31.7 per thousand in 1940 to 25.6 in 1955, a loss of 20 percent in 15 years. The trend in the US was in the opposite direction as the crude rate rose from 17.9 per thousand to 24.6 in the same period, a rise of nearly 40 percent.

A more refined measure of fertility, as shown in columns 3 and 4 of Table 1, is the ratio of births of female infants to the number of potential mothers -- that is, the number of girls born during a given year divided by the number of thousands of women 15 to 44 years of age. According to this measure, female fertility per 1,000 women of child-bearing age in the USSR fell from 62.2 to 48.4, a decrease of 22 percent (almost the same as the drop in the crude birth rate). On the

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other hand, the corresponding rate in the US rose from 39.0 per thousand to 56.7, or 45 percent, again about the same as the rise in the crude birth rate. Whereas in 1955 the Soviet crude birth rate was slightly above that of the US, the rate based on women 15 to 44 years of age only is 17 percent higher in the US. The reason for this striking difference between the two measures is that the number of women of childbearing age is a much smaller percent of total population in the US than in the USSR because of low fertility in the US in the 1920's and 1930's.

The gross reproduction rate, a third measure for comparing levels of human fertility, is also shown in Table 1. It indicates, for a given year, the number of daughters which 1,000 women would bear over their entire childbearing period if they continued the fertility pattern of that year. It is calculated simply by adding the birth rates of mothers at each age in the given year (as shown in Table 2\*) and multiplying the total by the percentage of births that are female. A gross reproduction rate of 1,000 implies that the women of the present generation would produce an equal number of daughters, and a rate of 1,800 indicates that 1,000 women would produce 1,800 daughters.\*\* The gross reproduction rate, like the other measures in Table 1, is based on the experience of a single year and may fluctuate drastically from year to year. Hence only the size and trend of the measure over a substantial period of time has any value for projection.

The gross reproduction rate indicates the same trend as the other rates shown in Table 1. The Soviet rate dropped from 1,800 in 1940 to 1,410 in 1955, a decrease of over 20 percent, while the US rate rose from 1,121 to 1,734, an increase of nearly 55 percent in the same period. In 1955 the US rate was 23 percent greater than that of the USSR. It is also noteworthy that the change in the Soviet rates occurred before 1950 and that for the next 5 years the rates remained stable. In the US, though the maximum change also occurred from 1940 to 1950, the trend continued to rise slightly in the next 5 years, thus adding about 15 percent more to the gross reproduction rate.

### 3. Underlying Causes.

The changes in the structure of the population of the USSR suggest that the fertility decline is largely attributable to war-induced

\* P. 5, below.

\*\* To measure population replacement, the gross rate is reduced to a net rate to allow for daughters born but not surviving to the same age as the mother at the time of the birth of the daughter.

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conditions which have continued more or less unchanged into the 1950's. These conditions are the deficit of males and the depressed level of living of the civilian population. Although there has been some slight improvement in both of these factors, it has not been sufficiently strong or of sufficient duration to increase fertility. Such upward pressure as these have exerted has been overbalanced by continued industrialization, the further spread of family planning, and longer attendance in school.

The composition of the population of the US suggests that a change in the proportion of women in the childbearing ages is not an important factor, because the proportion of the total population which was composed of women 15 to 44 years of age in 1950 was slightly less than in 1940. Other factors which appear in the population statistics are earlier marriage, earlier birth of first children, and larger completed family size. These factors, in turn, are probably induced by continued prosperity -- especially in the middle income groups -- and some change in the attitude toward larger families. These probabilities are to some extent confirmed by examination of birth rates in the US, by specific age groups, for 1940 and 1954 shown in Table 2. The table shows that the rates increased not only in the younger ages but up to the age of 40.

Table 2

Birthrates in the US, by Specific Age Groups  
1940 and 1954

Age Group	Total Births Per 1,000 Females	
	1940	1954
15-19	54.8	90.8
20-24	135.6	235.6
25-29	122.8	188.5
30-34	83.4	116.4
35-39	46.3	58.8
40-44	17.5	16.9
Total	<u>460.4</u>	<u>707.0</u>
Gross fertility a/	2,302.0	3,535.0
Female fertility a/	1,121.0	1,723.0

a. For methodology, see the Appendix.

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4. Future Prospects.

Although all the measures for comparing levels of human fertility used in this memorandum are based on the number of births in a particular calendar year, they are useful for charting past trends in fertility and comparing current levels in different populations. The gross reproduction rate is sometimes assumed to have predictive value as to the extent to which a population will change in the future. Such a use of the rate, however, makes the improbable assumption that the birth rates by age of mother in a particular year will remain constant for a generation. The differential behavior of these rates does make it possible, however, to isolate factors now at work and by assuming changes in these factors to predict possible short-range changes in fertility.

Five factors are considered in the prediction of possible changes in fertility in the USSR. The sex ratio and the level of living are changing from unfavorable to more favorable. The proportion of women in the young childbearing ages shows a slightly unfavorable trend. Finally, rapid urbanization and industrialization and more prolonged school attendance continue to operate as unfavorable factors. On balance the best estimate would be that the level of fertility will stabilize near the present levels for about two decades unless living conditions are improved markedly.

With reference to the US the relative strength of the factors is more difficult to gauge. The balance of the sexes and the age distribution have had little to do with the rise; in fact, a smaller proportion of women were between the ages of 20 and 35 in 1950 than in 1940. The essential change has been the lowering of the age of marriage, the lowering of the age of the mother at the birth of the first child, and the change in the desired size of completed family. Whether these factors have spent their force is difficult to determine. It should be noted, however, that the continuation of the present level of the gross reproduction rate would imply that the average number of children born to women upon attaining age 45 would be about 3.5 and that below the age of 25 an average of 1.5 children are born. If such high rates are maintained for the total female population, even higher rates per married woman would be necessary. On the other hand, the proportion of women 15 to 44 years of age who are under 30 years of age will begin to rise slightly in 1960.

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## APPENDIX

### METHODOLOGY

Crude birth rates are published for both the US\* and the USSR\*\* and therefore are considered to be firm figures.

For the US the rate of female fertility per 1,000 women of child-bearing age is also published.\*\*\* For the USSR the rate must be estimated on the basis of the annual birth rates and the estimated age-sex distribution of the population. The age-sex distribution has been estimated by the US Bureau of the Census in an unpublished memorandum. In the case of the US, this is considered a firm figure. In the case of the USSR, owing to the uncertainty as to the exact number of women 15 to 44 years of age, this rate has a margin of error of plus or minus 10 percent.

The gross reproduction rate is also published annually for the US\*\*\* but must be estimated for the USSR. This rate carries the process of estimation one step further. The first step is to estimate the number of women in each 5-year age group. The second is to estimate the number of births to mothers in each age group. In the case of the USSR, this was done by assuming that the total births which were calculated from the published birth rates were distributed as follows: the basic distribution was taken from 1926 rates but was modified to allow for slightly older mothers at the time of giving birth -- that is, the 1926 rates, by specific age groups, were given a weight of 8, and the pattern of a population with older mothers was given a weight of 2, and the two were averaged. Whereas the gross reproduction rate arrived at in this way should have no larger percentage of error than 10 percent, the rate for mothers in any particular age group might be subject to as much as 20-percent error. The computation of this rate is illustrated in Table 2.\*\*\*\* When the total births per 1,000 women in each 5-year age group have been cumulated, the result is multiplied by 5 to allow for the 5 years spent in each

\* Annual reports of the National Office of Vital Statistics, Washington, D.C. U.

\*\* The National Economy of the USSR, Moscow (FDD translation). U.

\*\*\* Vital Statistics Special Report no 8, National Office of Vital Statistics, 24 July 1956. U.

\*\*\*\* P. 5, above.

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age group. It is then reduced from total births to female births by multiplying by 0.488\* (the proportion of total babies who are girls). As explained in the text, although this rate is based on the experience of a single year, it is sometimes interpreted as representing the cumulative experience of a cohort of 1,000 women who start at age 15 and live through to age 45, thus representing the number of daughters born to such cohort and by implication the extent to which the mothers were reproducing themselves.

The relation of the gross reproduction rate to the female births per 1,000 women 15 to 44 years of age is apparent when it is realized that if the rate per 1,000 women in a single year is multiplied by 30 to allow for 30 years in the span of 15 to 44, the result equals approximately the gross reproduction rate.

\* Rounded figure.

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